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16. *DATA REPORT:* LATE NEOGENE BIOGENIC OPAL DATA FOR LEG 167 SITES ON THE CALIFORNIA MARGIN[1]

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INTRODUCTION

Ocean Drilling Program Leg 167 drilled thirteen sites in a series of depth and latitudinal transects along the climatically sensitive California margin to reconstruct the Neogene history of deep-, intermediate-, and surface-ocean circulation changes (Lyle, Koizumi, Richter, et al., 1997). Significant variations occurred in sediment properties on all time scales as seen in the high-resolution nondestructive shipboard measurements (e.g., bulk density and color reflectance), high- to intermediate-resolution downhole log measurements (e.g., resistivity and magnetic susceptibility), and lower resolution discrete shipboard measurements (e.g., physical properties and carbon geochemistry). Thus, these Leg 167 sites provide an opportunity to address paleoceanographic questions about the evolution of the California Current and links between the equatorial Pacific and the high-latitude North Pacific from millennial and orbital to tectonic time scales. This data report presents the results of biogenic opal analyses from a latitudinal transect of seven sites along the California margin for the time interval from 8 Ma to the present. Site selection for opal analyses was based upon such parameters as opal content, stratigraphic continuity, and lack of coring disturbance.

METHODS

The biogenic opal data presented in this report were measured at the Lamont-Doherty Earth Observatory Marine Sediment Analysis Facility (MSAF) using the reduction colorimetric technique described in Mortlock and Froelich (1989). A sample between 25 and 200 mg (depending on Si and $CaCO_3$ content) is freeze dried, powdered, weighed, and placed in 50-mL centrifuge tubes. The sample is oxidized using 10% H_2O_2 solution to remove organic carbon and then decarbonated using 5 mL of 1 N HCl. Twenty milliliters of deionized water is added to each tube, the sample is centrifuged at 4500 rpm, and the supernatant is discarded. A single-step extraction of Si is performed on the samples using 40 mL of 2 M Na_2CO_3 at 85°C for 5 hr. After centrifugation, 20 mL of the supernatant is transferred to a polyethelene vial. Dissolved silica is determined by amolybdate blue spectrometry. Absorbances are read at 812 nm using a Milton Roy Spectronic 501 spectrophotometer with a sipper flow-cell attachment.

Relative analytical precision, based upon hundreds of internal marine sediment standard analyses performed at the MSAF, is ±4%. Relative analytical precision is reduced to ±8% for samples with low opal content (<15 wt%).

Results in this data report are presented as percent biogenic opal as estimated from the equation

$$\% \text{ opal} = 2.4 \times \% \text{ Si}_{\text{opal}}.$$

RESULTS

The results of the biogenic opal analyses are presented in Table 1 and plotted vs. the meters composite depth (mcd) scale in Figure 1 (see the "Explanatory Notes" chapter in Lyle, Koizumi, Richter, et al. [1997] for a discussion of the mcd scale). To facilitate graphical comparison between sites, the data were also converted to the time domain (Fig. 2) using the shipboard magneto- and biostratigraphic datum events (Lyle, Koizumi, Richter, et al., 1997) compiled and presented in Ravelo et al. (1997). Although Sites 1010 and 1021 have analyzed opal records that extend back to 13 Ma, only the opal record for the past 8 Ma is shown in Figure 2. All analyzed opal data are shown in Figure 1 and presented in Table 1.

REFERENCES

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Table 1. Biogenic opal concentrations for a latitudinal transect of seven Leg 167 sites along the California margin.

Hole	Core	Type	Sect.	Interval (cm)	Depth (mbsf)	Offset (m)	Depth (mcd)	Age (Ma)	Opal (%)
1010C	6	H	1	34-36	43.84	5.78	49.62	4.283	9.98
1010C	6	H	1	110-112	44.60	5.78	50.38	4.343	8.42
1010C	6	H	2	34-36	45.37	5.78	51.15	4.404	8.94
1010C	6	H	2	110-112	46.13	5.78	51.91	4.464	10.82
1010C	6	H	3	34-36	46.87	5.78	52.65	4.539	9.79
1010C	6	H	3	110-112	47.63	5.78	53.41	4.621	9.72
1010C	6	H	4	36-38	48.39	5.78	54.17	4.704	11.94
1010C	6	H	4	110-112	49.13	5.78	54.91	4.784	11.02
1010C	6	H	5	34-36	49.87	5.78	55.65	4.846	11.32
1010C	6	H	5	110-112	50.63	5.78	56.41	4.906	10.40
1010C	6	H	6	35-37	51.38	5.78	57.16	4.964	10.45
1010C	6	H	6	110-112	52.13	5.78	57.91	5.028	10.53

Notes: Both the standard Ocean Drilling Program meters below seafloor (mbsf) depth scale and shipboard meters composite depth (mcd) scale are presented here. The offset column denotes the amount (in meters) each sample was shifted to align samples between different holes (see the "Explanatory Notes" chapter in Lyle, Koizumi, Richter, et al. [1997] for details on the mcd scale and composite core construction). Ages are linearly interpolated between magneto- and biostratigraphic tie points presented in Ravelo et al. (1997).

This is a sample of the table that appears on the volume CD-ROM.

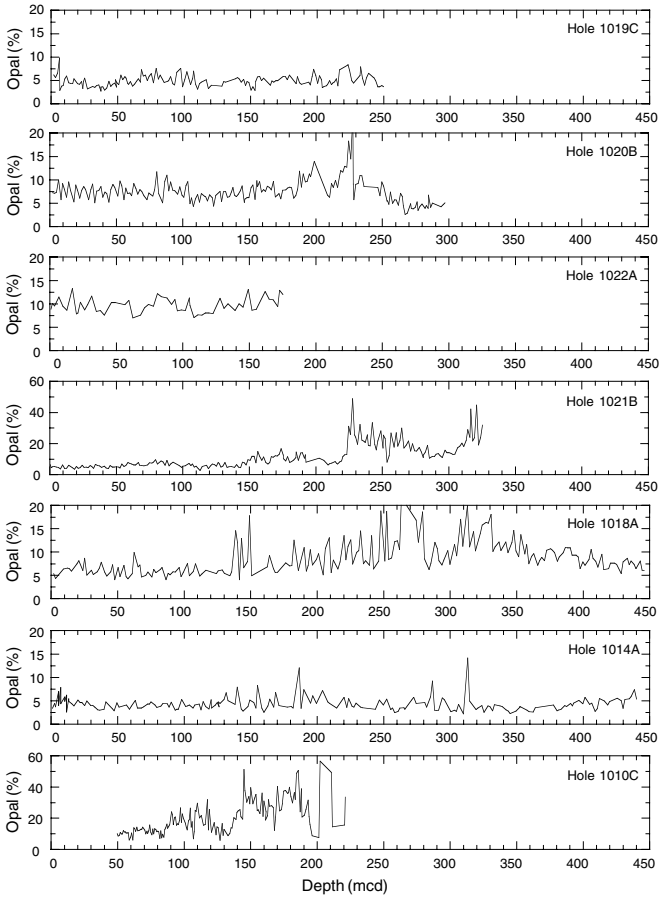

Figure 1. Biogenic opal concentrations vs. depth for a latitudinal transect of seven Leg 167 sites along the California margin (see the "Explanatory Notes" chapter in Lyle, Koizumi, Richter, et al. [1997] for details on the meters composite depth [mcd] scale). The sites are plotted from south (bottom plot) to north. Note that Sites 1010 and 1021 have different y-axis (opal percentage) limits.

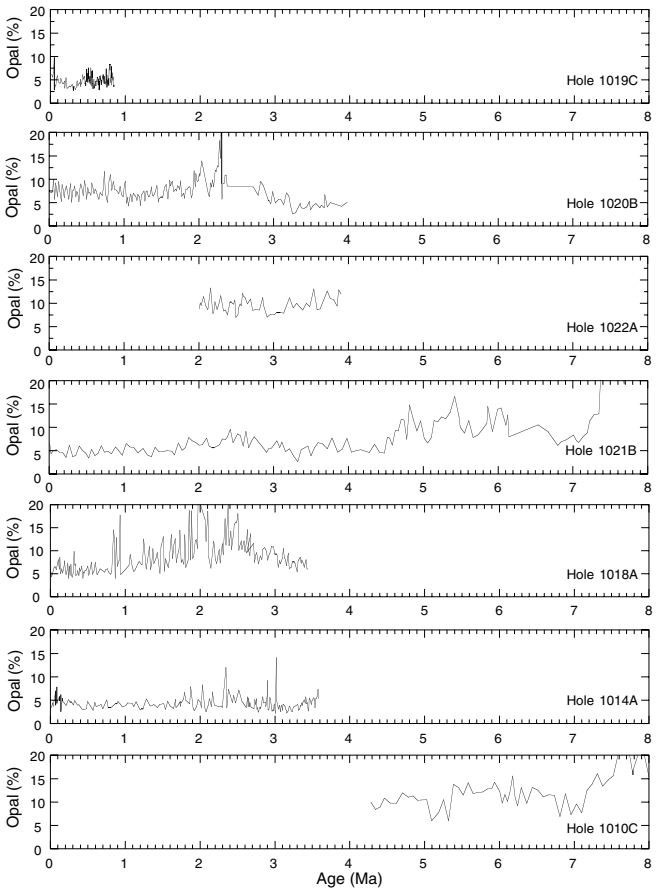

Figure 2. Biogenic opal concentrations vs. age for a latitudinal transect of seven Leg 167 sites along the California margin. The sites are plotted from south (bottom plot) to north. Note that Sites 1010 and 1021 contain biogenic opal records that extend to 13 Ma (only the portion of the record from 8 Ma to the present is shown in this figure). The entire analyzed opal data sets for Sites 1010 and 1021 are shown vs. depth in Figure 1 and presented in Table 1. Depth-to-age conversions were made using the shipboard magneto- and biostratigraphic datum events (Lyle, Koizumi, Richter, et al., 1997) compiled and presented in Ravelo et al. (1997).